In the Claims

The claims have been amended as follows.

1. (currently amended) A method for assembling an electronic module comprising:

attaching a chip to a first surface of a substrate using a first solder interconnection array;

attaching a board to a second surface of said substrate using a second solder interconnection array such that a space is defined between said board and said substrate having a gap height ranging from about 300 microns to about 900 microns, said second solder interconnection array residing entirely within said space; and

providing an underfill material within said space after said board has been attached to said substrate but prior to applying compressive forces to said electronic module, said underfill material having a filler material with a particle size ranging from about 32 microns to about 300 microns present in an amount ranging from about 60 to 64 weight percent, said underfill material being in direct contact with both said board and said substrate to maintain said space and optimize integrity of said second solder interconnection array during application of said compressive forces.

2. (previously presented) The method of claim 1 further including providing a mechanical support structure comprising at least one rigid metallic ball within said space.

3. (previously presented) The method of claim 1 further including providing a mechanical support structure comprising a bracket within said space.

4. (previously presented) The method of claim 1 further including providing a mechanical support structure comprising a frame within said space.

5. (currently amended) A method for assembling an electronic module comprising:

attaching a chip to a first surface of a substrate using a first solder interconnection array;

attaching an organic board to a second surface of said substrate using a second solder interconnection array thereby defining a space between said organic board and said substrate, said second solder interconnection array residing entirely within said space;

depositing an underfill material at discrete locations within said space after said organic board has been attached to said substrate but before applying compressive forces to said electronic module, said underfill material contacting both said organic board and said substrate and selected solder

joints of said second solder interconnection array for partially encapsulating said second solder interconnection array at said discrete locations; and

curing said underfill material to form a rigid matrix within said space to maintain and enhance integrity of said second solder interconnection array during application of said compressive forces.

6. (previously presented) The method of claim 5 further including the steps of cleaning surfaces of said organic board and said substrate within said space and heating said organic board followed by depositing said underfill material to increase wetting characteristics of said underfill material and enhance adhesion of said underfill material to said organic board and said substrate.

7. (original) The method of claim 5 further including the step of providing at least one rigid metallic ball within said space to further maintain and enhance integrity of said second solder interconnection array.

8. (original) The method of claim 5 further including the step of providing at least one mechanical support structure selected from the group consisting of a bracket, a frame and a collar within said space to further maintain and enhance integrity of said second solder interconnection array.

9. (original) The method of claim 5 wherein said second solder interconnection array comprises a single melt solder interconnection array.

10. (original) The method of claim 5 wherein said second solder interconnection array comprises a dual melt solder interconnection array.

11. (canceled)

12. (canceled)

13. (original) The method of claim 5 wherein said space has gap heights residing between said organic board and said substrate ranging from about 300 microns to about 900 microns, said underfill material being capable of filling said gap heights.

14. (previously presented) The method of claim 13 wherein said underfill material in its uncured state comprises a polymeric material having a filler material present in an amount ranging from about 60% by weight per solution to about 64% by weight per solution, said filler material having a particle size ranging from about 32 microns to about 300 microns in diameter.

15. (original) The method of claim 14 wherein said underfill material in its uncured state has a density ranging from about 1.5 g/cc to about 2.0 g/cc, a viscosity at 25°C greater than about 5,000 cP, and a Thixotropic Index ranging from about 1.0 to about 2.0.

16. (original) The method of claim 15 wherein said underfill material in its cured state has a glass transition temperature ranging from about 135°C to about 145°C, and a dynamic tensile modulus strength at about 25°C greater than about 5 Gpa.

17. (original) The method of claim 16 wherein said substrate comprises a ceramic substrate, said cured underfill material has a CTE below Tg of about 18 ppm/°C to about 21 ppm/°C, and a CTE above the Tg of about 85 ppm/°C.

18. (original) The method of claim 16 wherein said substrate comprises a organic substrate, said cured underfill material has a CTE below Tg of about 12 ppm/°C to about 25 ppm/°C, and a CTE above the Tg of about 70 ppm/°C.

19. (currently amended) An electronic module assembly comprising:

a chip attached to a first surface of a substrate via a first solder interconnection array;

a board attached to a second surface of said substrate via a second solder interconnection array;

a space defined between said organic board and said substrate having a gap height ranging from about 300 microns to about 900 microns, said second solder interconnection array residing entirely within said space; and

a rigid matrix of underfill material only within said space being in direct contact with both said board and said substrate for encapsulating said second solder

interconnection array to maintain said space and optimize integrity of said second solder interconnection array, said underfill material having a filler material with a particle size ranging from about 32 microns to about 300 microns present in an amount ranging from about 60 to about 64 weight percent.

20. (previously presented) The assembly of claim 19 further including a creep resistant structure selected from the group consisting of a metallic ball, a bracket, a frame, a collar, and combinations thereof.

21. (previously presented) The method of claim 1 wherein said underfill material partially encapsulates said second solder interconnection array at discrete locations.

22. (previously presented) The assembly of claim 19 wherein said underfill material partially encapsulates said second solder interconnection array at discrete locations.